

THE REPRESENTATION OF STORMWATER MANAGEMENT IN DESIGN: TOWARD AN ECOLOGICAL AESTHETIC

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REFERENCE: *Proceedings of the 1995 Georgia Water Resources Conference*, held April 11 and 12, 1995, at the University of Georgia, Kathryn J. Hatcher, Editor, Carl Vinson Institute of Government, The University of Georgia, Athens, Georgia.

Abstract. Carefully planned stormwater management can help to mitigate the disturbance caused by urban development. Though landscape architects, planners, and urban designers acknowledge its importance, many generally regard stormwater management as a necessary burden, another element of the elaborate infrastructure regulations that must be met, but would be best kept out of sight—literally and symbolically buried. This attitude toward drainage infrastructure as an unsightly but necessary intrusion—a hazard that must be “fenced off” from the rest of the landscape—reflects a deeply entrenched aesthetic bias that must be questioned in light of the more balanced relationship between infrastructure and natural process made possible by sustainable design technologies today.

This paper describes the existing gap between stormwater management technology and aesthetic expression and discusses models of contemporary environmental design that are beginning to bridge the gap. Design in this new aesthetic, rather than being a mask that screens the functional, becomes an integral part of the stormwater management system, completing the physical disinterment of the urban waters by making visible and comprehensible the complex relationship that exists between a natural process, the hydrologic cycle, and the city's framework for it, the stormwater management system.

INTRODUCTION

Many of our urban waters, once channelized or buried in pipes and sent downstream, now meander more slowly above ground, infiltrating through the soil, recharging groundwater, or filling artificially created lakes, wetlands, and detention ponds. This new technology has introduced a vocabulary of technical and earthen forms such as the detention basin, the channel, and the outlet, that are becoming familiar elements in the urban landscape. In spite of their increased presence in the urban landscape, however, designers have yet to incorporate these new forms into their palette. For the most part, designers continue to isolate evidence of stormwater management technology from the rest of the landscape

with vegetative screens or fencing.

The reasons for the designer's mute response to stormwater management are manifold. Some of many explanations are that the idea of nature as a beautiful place is a deeply ingrained part of our cultural heritage: we perceive technology as a rude intrusion into the pastoral bliss of the urban park (Marx 1964). As a culture, we also associate unpredictable natural events, such as the sudden storm or flood, with disruption and disaster. This fear of the variable in nature has led to an over-emphasis on control and constancy in our technology, and subsequently in its representation in our design. Partly in response to a narrow aesthetic definition of nature and the fear of natural process, the variable fluctuation associated with the hydrologic cycle has become virtually invisible. A vast infrastructure of subterranean pipes and culverts remains to convey stormwater out of sight and out of the city.

By continuing to reflect these biases in our designs, we are missing a valuable opportunity for public education and design innovation (Hough 1984, Spirn 1984). An avant garde of ecological artists and innovative environmental designers have begun to grasp the opportunities that sustainable stormwater management presents (Matilsky 1992). The new forms associated with stormwater management, in their designs, have moved from the screened periphery of the landscape to become its focus, a provocative organizing motif. The designed landscape becomes a stage set upon which the “performance” of the environmental event of the storm takes place. Embraced in this new ecological aesthetic, the functional recharge basin or inlet receives a new importance in design as a manifestation of the sustainable approach to stormwater management.

Today's innovative stormwater management designs vary dramatically in terms of size, use of materials, and degree of engagement of the hydrologic cycle. Some designs are purely representational, others both represent the cycle and physically interact with it. A final level of engagement—of most interest to those of us concerned with water and environmental quality—both represents the cycle, interacts with it, and begins to ameliorate negative impacts of its disturbance.

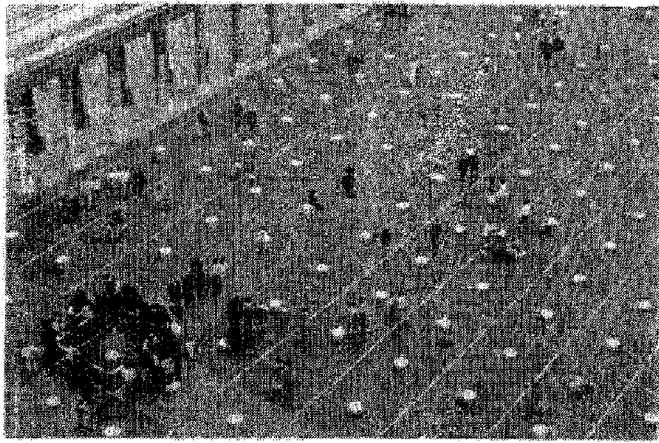


Figure 1. Daniel Buren. Aerial view, *Les Deux Plateaux*, 1986, Cour d'honneur, Palais Royal, Paris. Reproduced from Daniel Buren and Falmmarion, *Photo souvenir* (Postcard) *Les Deux Plateaux, travail in situ, detail*.

REPRESENTATION

Daniel Buren's sculptural installation in the Palais Royal in Paris, *Les Deux Plateaux*, is a pedestrian plaza broken by a grid of striped columns of varying heights (Fig. 1). Each column breaks the plane of the plaza to intersect at a second level, the other plateau. Four linear, subterranean streams flow through this second level, crossing each other at four intersections. Above ground, the columns mark the presence of the stream below by reflecting in their heights the stream's changing elevation. Storm grates also differentiate the flow below from the paved surface of the remainder of the plaza. Only one grid, in a corner above the intersection of two of the linear streams, remains open, allowing visitors to the plaza a glimpse of the mysterious workings below: surrounded by a metal fence, 5 meters or so below this break in the pavement, the linear waters' intersection forms a perfect square, flowing around the column that originates at the center of this grid, passing through the opening and above the surface, to receive coins tossed from children behind the fence.

Buren's installation is an insightful commentary on the two levels of the city — the smooth continuous plane of the perceived level and the hidden working infrastructure below this surface. He has organized familiar traces of the hidden second level of the city — storm grates and the sound of water flowing below — into an engaging design, which heightens the visitor's consciousness of the seemingly mundane "second plateau" revealing it as something actually quite extraordinary.

In her sculpture *Catch Basin* in St. James Park, Toronto, Canada, artist Nancy Holt similarly transforms purely utilitarian stormwater management forms into elements of an engaging environmental design (Hess 1992). Resembling at first glance a piece of abstract art, with its

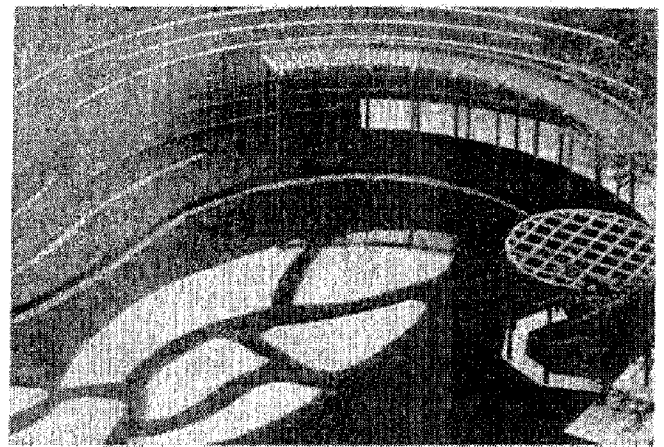


Figure 2. Mary Miss. University Hospital, Seattle, Washington, 1990 (Higuchi 1991).

huge, brightly colored geometric forms assembled at jagged, abrupt angles on top of a manicured swath of lawn, the sculpture reveals itself instead to be a fancifully elaborated outlet. The bright orange horizontal lines at the base of the sculpture double as storm drains or rills at the low point of a gentle swale, collecting the water that flows overland from the surrounding turf and emptying it in a large, hemispherical basin with a grate at its base. This bright white basin, outlined in black, serves as a marker (or target), calling attention to that place where the water leaves the surface of the earth to disappear into the storm sewer below. A large black metal frame hovers above the basin, inviting rainwater from the sky, or, conversely, guiding the direction of its evaporation. This work reveals and celebrates the interaction of technology and the hydrologic cycle, as Holt explains: "it's a very satisfying experience to watch the rainwater be collected in these channel pipes, go rushing into the central basin, and then disappear into the ground" (Hess 1992). No longer hidden from view on the periphery of the park, stormwater in Holt's work is the focus.

In her design for University Hospital in Seattle, Washington, artist Mary Miss turns even the ubiquitous chain-link fence that typically surrounds detention basins into an engaging design element (Fig. 2). In this elegant earthwork, the artist has carved several small basins out of a natural valley and filled them with sand to distinguish their forms from the surrounding grass. Beginning on one side of the basins, miniature terraces, like waves or reverberations from a raindrop in a pool of water, emanate from the low point to drift up the adjacent slope. Several chain-link fences, laid in repeating arcs, echo the terraces and further enclose the basins. Wooden seating and an arbor complete the arc, and reinforce the sense of the earthwork as a stage set for the water's performance. With rain, the small pools fill with water to reflect the sky;



Figure 3. Herbert Bayer. Aerial view, *Mill Creek Canyon Earthworks* 1979-1982, Kent, Washington (Beardsley 1992).

when the rain stops the pools act as miniature infiltration basins from which the water slowly evaporates into the atmosphere or infiltrates into the earth, once again leaving the dry sand of the basin exposed.

Although the sculptures described above engage natural process by dramatizing and celebrating the hydrologic cycle as an integral part of the work, the interaction, for the most part, is largely symbolic. Only Mary Miss' sculpture at University Place allows the cleansing aspects of natural processes — the ponding of water and its infiltration into the earth — to occur. Many designs have moved beyond this largely symbolic level of engagement by both thematically and practically ameliorating the city's adverse impacts on the natural process of the hydraulic cycle. Like the artists described above, these designers draw their imagery from the worlds of technology, hydraulics, and environmental engineering. They use the utilitarian forms to not only express a dialogue between culture and nature, but also to ameliorate the negative impact of human presence on a stressed system.

MITIGATION

In Mill Creek Canyon Earthworks at Kent, Washington, completed in 1982, artist Herbert Bayer graded the lowland in an urbanized valley to detain stormwater (Fig. 3). By detaining peak volumes of flow, the detention basin reduces the impact of storm flow from the urbanized areas on the banks and beds of waters downstream. In the rainy season the basin fills with water, assuming the familiar form of a community lake. In dry seasons, however, its grassed sculpted basin becomes another place altogether; it is both an amphitheater and a playscape through which water flows in a small stream. Bayer, trained as a graphic designer in the Bauhaus, has here embossed an intricate design of circular rings, undulating

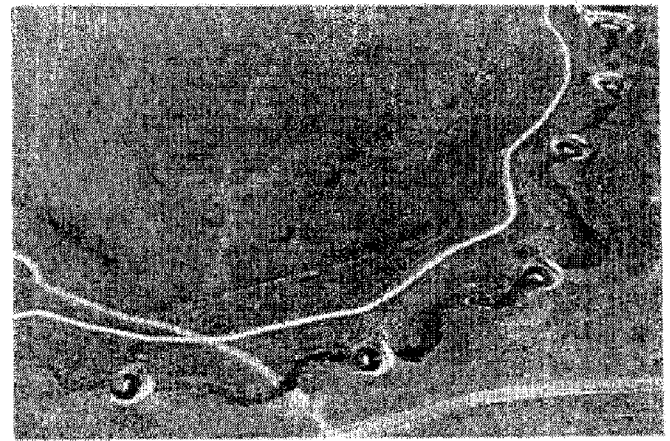


Figure 4. William Wenk and Associates. Aerial view of site, *Shop Creek Park*, late 1980s, suburbs of Denver, Colorado (Strutin 1991).

waves and terraces into the basin, creating various opportunities both for the water's containment and for people's pleasure.

Herbert Bayer's sculpture not only engages natural processes, but also ameliorates human impacts upon these processes by reducing the impact of peak flows of stormwater on drainage systems downstream. His design exists along a continuum of engagement with natural processes, one that moves from mitigation — treating the symptoms of disturbance — toward healing — remedying the problem and reversing the disruptive impact of human presence. William Wenk and Associates have progressed further along the continuum toward healing at Shop Creek Park in Denver, Colorado by incorporating an expanded palette of plant material to replace systems of conveyance with natural, more sustainable alternatives (Fig. 4).

RESTORATION

A constructed wetland and a series of sculpted dams at Shop Creek Park both manage stormwater runoff from surrounding residential areas and improve the water's quality. A series of crescent-shaped sculpted dams, dispersed across the landscape, become integral parts of a much larger healing environment. Because they are constructed from the sandy soil found on site, they appear to have grown out of the site. Their geometric forms, however, reveal their human fabrication and artificiality.

Each of the five sculpted rough-surfaced dams or drop structures "...shallowly stairsteps down eight-foot drops in the streambed...As stormwater rushes down the central section of each crescent, the stairstep rocks slow the water. At the bottom of the drop structure, the stream spills into a plunge-pool where the points of the crescent focus the water back in on itself, slowing a stormy current even

more." The dams, like Mary Miss' sculpture at University Place and Herbert Bayer's earthworks at Mill Creek Canyon, thus become stage sets for the environmental event of the storm. Beyond engaging and interacting with the storm, they are integral parts of a larger natural system — a constructed wetland — that heals the system by cleansing the water of phosphorous brought in with the runoff from adjacent residential yards.

The sculptures within this landscape, as obvious functional elements, work with natural process to balance and accommodate a human presence within the system. Here the human presence, through scientific understanding and technological innovation, has not only remedied its negative impact on a natural system, but also expressed this interaction through the medium of art.

CONCLUSIONS

The need for a resurfacing of the waters in our cities is of critical importance not only for ecological sustainability, but also for public perception and understanding. A restored landscape alone may heal a larger disturbed system, but unless it reveals the processes by which it does so to the public in order to educate and engage them, they may not value and support it (Johnson and Johnston 1993).

The designed water features described above illustrate three levels of engagement of the hydrologic cycle, from the abstraction of a natural system, to the interaction with that system's fluctuation, toward healing and restoration. In the third level, natural cycle, urban function and aesthetic expression have been integrated into landscapes that are both ecologically sustainable and imbued with meaning. These landscapes form the foundation of an expanded aesthetic that reconnects culture to nature.

Until recently, designers and artists who work in the landscape have largely ignored the expressive potential of hydrologic and fluvial processes. The designs described above are a few of the exceptions, representing the tentative exploration of what could become a new language of aesthetic expression in the landscape.

ACKNOWLEDGMENTS

Professor Bruce Ferguson and Professor Ian Firth of the University of Georgia served as faculty advisors for the MLA thesis upon which this paper is based (Calabria, Tamara Graham, 1995. *The Representation of Stormwater Management in Design: Toward an Ecological Aesthetic*. MLA Thesis, The University of Georgia).

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